ARRAY

TYPES OF ARRAY

- It is a group of variables of similar data types referred by single element.
- It elements are stored in a contiguous memory location.
- The size of array should be mentioned while declaring it.
- Array elements are always counted from zero (0) onward.
- Array elements can be accessed using the position of the element in the array.
- Array can have one or more dimensions.

Advantages of an Array in C

- Random access of elements using array index.
- Use of fewer line of code as it creates a single array of multiple elements.
- Easy access to all the elements.
- Traversal through the array becomes easy using a single loop.
- Sorting becomes easy as it can be accomplished by writing fewer line of code.

TYPES OF ARRAY

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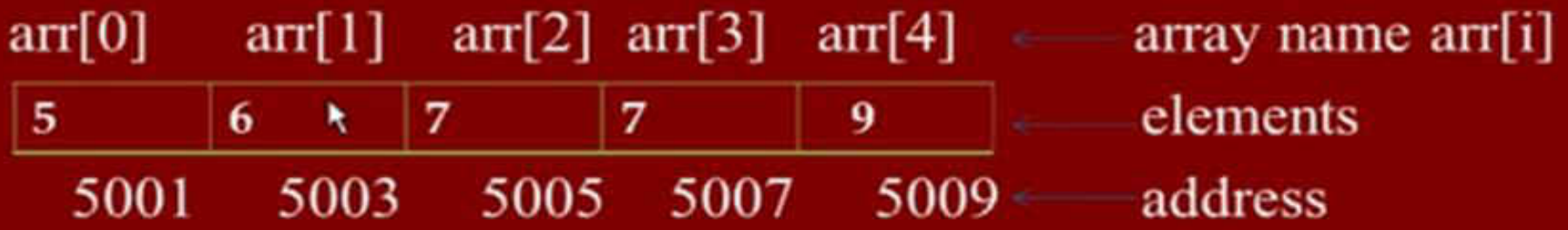
1. One Dimension Array
2. Two Dimension Array
3. Three Dimension Array

One Dimension Array

Ex:Arr[5] ={1 row, multi column}



Declaration:

<data-type> <array name> [size];

EX: int arr[5];

Two Dimension Array

ex: arr[i][j] ={multi row, multi column};

arr[][j] column

arr[i][] row

Arr[0][0]	Arr[0][1]	Arr[0][2]	Arr[0][3]	Arr[0][4]
Arr[1][0]	Arr[1][1]	Arr[1][2]	Arr[1][3]	Arr[1][4]
Arr[2][0]	Arr[2][1]	Arr[2][2]	Arr[2][3]	Arr[2][4]
Arr[3][0]	Arr[3][1]	Arr[3][2]	Arr[3][3]	Arr[3][4]

Declaration:

<data-type> <array_nm> [row_subscript][column-subscript];

Ex: int arr[4][5];

Three Dimension Array

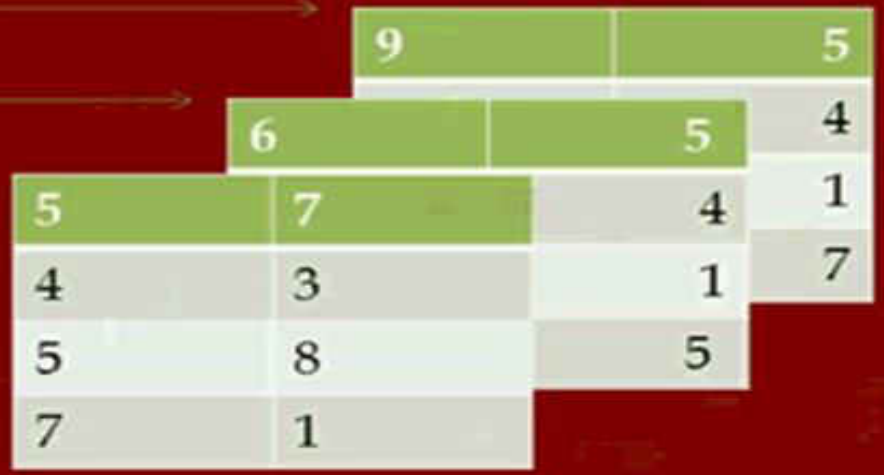
Ex: arr[i][j][k] = arr[3][4][2];

array of arrays of arrays

2nd 2D Array

1st 2D Array

0th 2D Array



Declaration:

<data-type> <array nm>[array subscript][row subscript][column subscript];

Ex: float arr[3][4][2]

One Dimension Char Array

```
void main()
{
char a[5]=“HELLO”;
printf(" %c",a[3]);
}
```

One Dimension Char Array

```
void main()
{
char a[5]=“HELLO”;
printf(" %c",a[0]);
printf(" %c",a[1]);
printf(" %c",a[2]);
printf(" %c",a[3]);
printf(" %c",a[4]);
}
```

One Dimension Char Array

```
void main()
{
int i;
char a[5]=“HELLO”;
for(i=0;i<5;i++)
{
printf(" %c",a[i]);
}
```

One Dimension int Array

```
void main()
{
int a[5]= {45, 54, 46, 76, 38};
printf(" %d",a[0]);
printf(" %d",a[1]);
printf(" %d",a[2]);
printf(" %d",a[3]);
printf(" %d",a[4]);
}
```

One Dimension int Array

```
void main()
{
int i;
int a[5]= {45, 54, 46, 76, 38};
        for(i=0;i<5;i++)
        {
        printf(" %d",a[i]);
        }
}
```

One Dimension Array

```
void main()
{
int a[5],i;
printf(“ENTER MARKS OF 5 SUBJECTS");
for(i=0;i<5;i++)
{
scanf("%d",&a[i]);
}
printf(“ENTERED MARKS ARE AS FOLLOWS : \n");
for(i=0;i<5;i++)
{
printf(" %d /t",a[i]);
} }
```

2D ARRAY

Two Dimension Array

The array which is used to represent and store data in a tabular form is called as 'two dimensional array.' Such type of array specially used to represent data in a matrix form.

Example:

```
int a[3][3] = {2, 3, 5,5,6,8,4,5};
char ch[4][8] = "TechnoExam indelhi " ;
float stax[2][2] = {5003.23, 1940.32, 123.20,-45.5} ;
```

Syntax:

```
<data-type> <array_nm> [row_subscript][column-subscript];
```

Total Size (in Bytes):

Ex: int a[3][3];

'a' is an array of type integer which has storage size of 3 * 3 matrix.

Total size = length of array * size of data type

Ex :3 * 3 * 2 = 18 bytes.

Two Dimension Array

	Column 1	Column 2	Column 3	Column 4
Row 1	x[0][0]	x[0][1]	x[0][2]	x[0][3]
Row 2	x[1][0]	x[1][1]	x[1][2]	x[1][3]
Row 3	x[2][0]	x[2][1]	x[2][2]	x[2][3]

Different ways to initialize two dimensional array

```
int a[2][3] = {{1, 3, 0}, {-1, 5, 9}};

int a[][3] = {{1, 3, 0}, {-1, 5, 9}};

int a[][] = {1, 3, 0, -1, 5, 9};
```

Example - Two Dimension Array

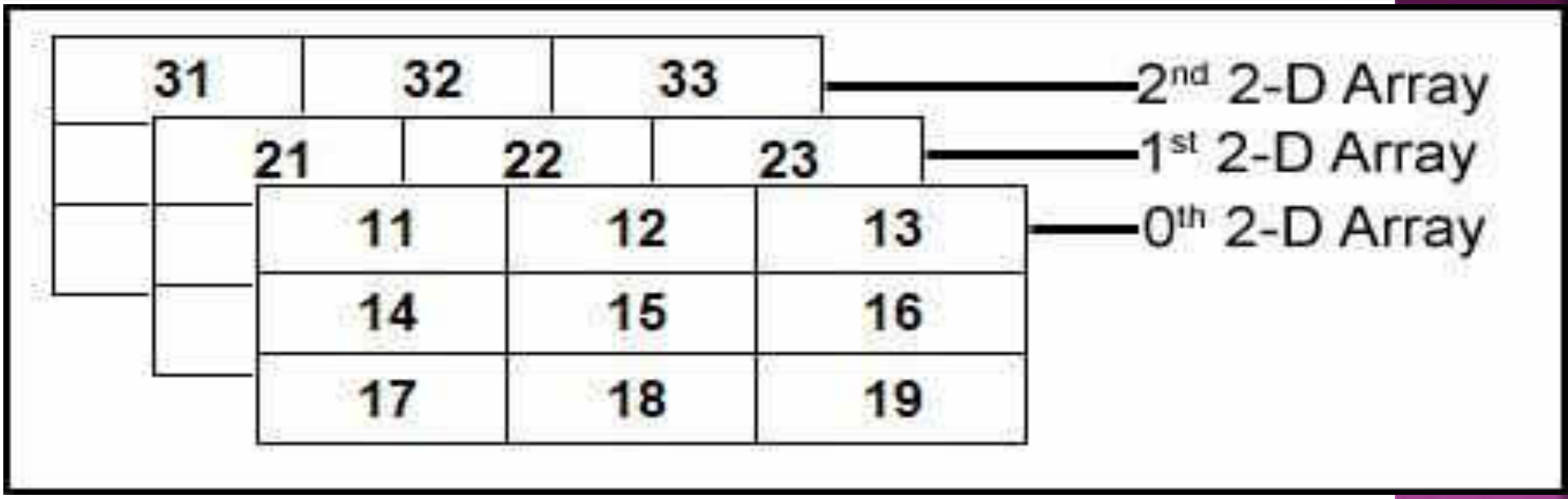
```
#include<stdio.h>
#include<conio.h>
void main()
{
int arr[3][3];
int i,j;
clrscr();
printf(“enter the 9 number:");
for (i=0;i<3;i++)
{
for(j=0;j<3;j++)
{
scanf("%d",&arr[i][j]);
} }
printf("number are as follows:\n");
{
for (i=0;i<3;i++)
    {
     for (j=0;j<3;j++)
          {
          printf("\t%d",arr[i][j]);
          }
printf("\n");
}
getch();
}}
```

3D ARRAY

Three Dimension Array

- ✓A 3D array is essentially an array of arrays of arrays:
- ✓it's an array or collection of 2D arrays,
- ✓and a 2D array is an array of 1D array.
- ✓It may sound a bit confusing, but as you practice working with multidimensional arrays, you start to grasp the logic.
- ✓The next diagram will help you to understand:

Three Dimension Array



<---------- 0th 2D Array ---------->									<---------- 1st 2D Array ---------->									<---------- 2nd 2D Array ---------->								
11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	29	31	32	33	34	35	36	37	38	39
1000	1002	1004	1006	1008	1010	1012	1014	1016	1018	1020	1024	1026	1028	1030	1032	1034	1036	1038	1040	1042	1044	1046	1048	1050	1052	1054

Example - Three Dimension Array

```
#include<stdio.h>
#include<conio.h>
 void main()
{
int i, j, k;
int arr[3][3][3]=
      {
         {
         {11, 12, 13},
         {14, 15, 16},
         {17, 18, 19}
      },
      {
                {21, 22, 23},
                {24, 25, 26},
                {27, 28, 29}
      },
      {
                {31, 32, 33},
                {34, 35, 36},
                {37, 38, 39}
      },
      };
```

Three Dimension Array

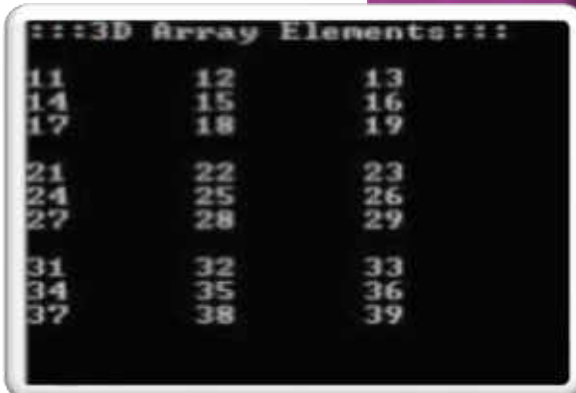
```
clrscr();
printf(":::3D Array Elements:::\n\n");
for(i=0;i<3;i++)
{
        for(j=0;j<3;j++)
                {
                for(k=0;k<3;k++)
                        {
                        printf("%d\t",arr[i][j][k]);
                        }
                printf("\n");
                }
   printf("\n");
}  getch();  }
```

Example - Three Dimension Array

```
void main()
{
int i,j,k;
int  arr[3][3][3];
printf("Enter 3D array values:");
for(i=0;i<3;i++)
{
for(j=0;j<3;j++)
{
for(k=0;k<3;k++)
{
scanf("%d",&arr[i][j][k]);
}}}
```

Three Dimension Array

```
clrscr();
printf(":::3D Array Elements:::\n\n");
for(i=0;i<3;i++)
{
        for(j=0;j<3;j++)
                {
                for(k=0;k<3;k++)
                        {
                        printf("%d\t",arr[i][j][k]);
                        }
                printf("\n");
                }
   printf("\n");
}  getch();  }
```



ARRAY with FUNCTION

```
#include<iostream.h>
#include<conio.h>
void arr(int);
void main()
{
 int i;
 clrscr();
 int marks[]={23,34,45,62,78};
 for(i=0;i<5;i++)
 {
 // cout<<marks[i]<<endl;
 arr(marks[i]);
 }
 getch(); }
```

```
void arr(int m)
{
 cout<<m<<endl;
 }
```

Example – Array with Function

```
#include<stdio.h>
#include<conio.h>
void display(int);
void main()
{
int i;
int marks[]={23,34,45,62,78};
clrscr();
for(i=0;i<5;i++)
{
display(marks[i]);
}
getch();
}
```

```
void  display(int m)
{
printf("\n\n%d",m);
printf("\t modified array is %d:",m+2);
}
```

ARRAY with POINTER

```
void main()
{
int p, arr[ ] = {2,3,4,5,6};
printf(“array elements are as follows:");
for(p=0;p<5;p++)
{
printf(" \n %d and address of arrays: %u",arr[p],&arr[p]);
}
}
```

THANKS